Business Models for open data (ecosystems)

Frederika Welle Donker
Assistant professor Delft University of Technology
Faculty of Architecture & the Built Environment

f.m.welledonker@tudelft.nl

http://www.kcopendata.eu
Brief introduction

• Assistant Professor at Delft University of Technology

• Researcher attached to Knowledge Centre Open Data

• Coordinator of 2 MSc Geo Courses

• Partner in 3 international research projects

http://www.kcopendata.eu
Overview of this presentation

• Introduction to business model theory

• Potential value propositions for open data organizations

• New insights / developments
Business model definition

"Abstract representation of an organization (in particular a National Mapping & Cadastral Agency), be it conceptual, textual, and/or graphical, of all core interrelated architectural, co-operational, and financial arrangements designed and developed by an organization presently and in the future, as well as all core products and/or services the organization offers, or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives”

(Al-Debei, M.M. & D. Avison 2010)
Business models are frameworks

“method of doing business by which a company can sustain itself – i.e. to generate revenue” (Rappa 2003)

“derived from an organization’s mission and strategy and contain the logic and rationale to generate value” (Keen & Qureshi, 2006)

“describes and explains how an organization creates, delivers, and captures value” (Osterwalder & Pigneur 2010)
Business models aspects

- often associated with generating revenue
- can also aim at generating public value
- will only be successful if they are able to adapt to a changing environment
Some business model misconceptions

• Business model ≠ business case
  • A business case is a justification for undertaking a project to obtain funding

• Business model ≠ a value proposition
  • part of the service domain

• Business model ≠ a revenue model or pricing mechanism
  • part of the financial domain
Business model components, STOF model (Bouwman et. al 2005)

**Value architecture**
- What?; to whom?
- Why?; with which capacity?

**MARKET DYNAMICS**
- e.g. changing customer demands, competition

**SERVICE DOMAIN**
- Value proposition
- Market segment

**TECHNOLOGY DOMAIN**
- Functionality required

**FINANCIAL DOMAIN**
- Cost structure
- Profit potential

**TECHNOLOGICAL ADVANCEMENTS**
- e.g. Ambient awareness

**NETWORK VALUE**
- e.g. Revenues
- e.g. Ease of use, costs, experience

**ORGANIZATION DOMAIN**
- Structure of value network

**CHANGES IN LEGISLATION**
- e.g. Antitrust and privacy legislation

**a. Cost model**
**b. Revenue model**
Business model canvas (Osterwalder & Pigneur 2010)
6- Value framework (Zeleti & Ojo 2016)
Common value components

1. **Value proposition**: specifies the value that is delivered and offered to different stakeholders.

2. **Value creation**: refers to the execution of particular actions to generate the desired value.

3. **Value capture**: the process of retaining some part of the value produced in the value adding process.

http://www.kcopendata.eu
## Triple bottom line business model canvas

<table>
<thead>
<tr>
<th>Key Partners</th>
<th>Key Activities</th>
<th>Value Proposition</th>
<th>Customer Relationships</th>
<th>Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Key Infrastructure &amp; Key Resources</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Budget costs</th>
<th>Revenue Streams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental costs</td>
<td>Environmental Benefits</td>
</tr>
<tr>
<td>Social costs</td>
<td>Social Benefits</td>
</tr>
</tbody>
</table>

http://www.kcopendata.eu
### Mission Statement 2: Connection of Wheatley Group owned Drygate Housing to the Tennents Brewery heating system to provide low carbon and low cost heating to an area of fuel poor residents, demonstrate connection of external customers to a private sector heating network.

#### Key Partnerships
The key partnership is between the Tennents Caledonian Brewery (TCB) [heat generator] and The Wheatley Group (TWG) [heat consumer].

#### Key Activities
- Installation of connecting heat network. Removal of existing dry heating system, installation of new wet system, creation of back up energy centre.
- Establishment of contractual relationship.

#### Key Infrastructure & Key Resources
- Energy centre, domestic heating system.

#### Value Proposition
The connection will allow for the provision of low cost, low carbon heat to residents in the city who suffer from extreme fuel poverty.

#### Buy in & Support
- TWG – Senior management, legal, technical, governance, financial.
- TCB – Senior management, technical, financial.

#### Deployment
- Connection to power network not viable until 2022. Project cannot progress until grid reinforcement complete.

#### Budget Costs
Installation of pipe network in roads, removal of dry heating system, installation wet of distribution network in housing, creation of TCB energy centre, creation of TWG back up energy centre.

#### Environmental Cost
No notable impacts from project outside of temporary impacts resulting from construction/installation.

#### Environmental Benefits
- TCB expect to reduce CO₂ emissions as a result of Gas CHP.
- TWG expect to see improved living conditions for residents and reduced CO₂ emissions.

#### Social Cost
No notable impacts from project outside of temporary impacts resulting from construction/installation.

#### Social Benefits
- Improved living conditions and life expectancy of residents through alleviation of fuel poverty.

#### Source:
Sheombar et al. (2020), p.54
Triple layered business model canvas

Horizontal coherence

Vertical coherence

source: Joyce & Paquin (2016), p.1482 & 1483
http://www.kcopendata.eu
Example of a triple bottom line business model canvas for a data platform

Source: Sheombar et al. (2020), p.56
Open data revenue models (Ferro & Osella 2013)

Source: Ferro & Osella 2013, p. 2
Pricing mechanisms

- Utility / on-demand / pay-as-you-go
  - Fee for actual use per area / size / session

- Subscription
  - Periodic fee in advance, (un)limited use thereafter

- Community
  - Users invest time and effort

- Advertising

- Sponsorship

http://www.kcopendata.eu
Open data organization categories

1. Data providers
   • Organizations that provide data or services

2. Data enablers
   • Organizations that assist other organizations in managing, publishing and using data

3. Data end-users
   • Use open data to support their primary processes
Value propositions for open data providers

• **Indirect benefits**: release data to support primary goal(s) of the organization. OD to lead to stimulate economic value, transparency, etc.

• **Cost savings**: release data to lead to internal cost avoidance, efficiency gains and/or increase the quality of data through user participation

• **Additional fee-based services**: Infrastructural Razor & Blades, Open Source Like, Freemium, Premium

http://www.kcopendata.eu
Categories of open data enablers

Enablers / brokers / intermediaries / infomediaries

1. **Supply facilitators**: provide technologies/services to data providers, sometimes including data management/data curation

2. **Access facilitators**: support data users to access data from different sources by e.g. aggregation, harmonization, structuring

3. **Service creators**: provide a service/specific application/tailor-made solutions to certain target groups

http://www.kcopendata.eu
Smart City Business Models (1/2)

Business Model A: Data for sale
- Monetizing internally generated data or crowdsourced data (e.g. via sensors, mobile phones)
- Monetizing data generated for a specific purpose for new purposes

Business Model B: Data collection and aggregation as a Service
- Big (open) data scrubbed and processed for end-users
Smart City Business Models (2/2)

Business Model C: Data use and analytics as a Service

- Data are collected and analysed to answer specific questions in a B2B, B2C or P2P environment
  - Way-finding apps
  - Energy transition decision-making, e.g. neighbourhood scans

Business Model D: multi source data mash-up and analysis

- Enrichment of data provided by clients with data from other (open) sources
  - Data-driven cycling app, tailored to the local context

http://www.kcopendata.eu
Categories of open data end-users

Use open data products to support primary tasks

1. Public sector:
   - provide public services
   - decision-making processes
   - Internal efficiency / effectiveness

2. Private sector:
   - augment business capabilities
   - internal efficiency / effectiveness

http://www.kcopendata.eu
## Summary for open data providers

<table>
<thead>
<tr>
<th>Business model</th>
<th>Value proposition</th>
<th>Value creation</th>
<th>Value capture</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data providers for indirect benefits</strong></td>
<td>Open data supporting strategic business objectives</td>
<td>Publishing data</td>
<td>Improved outcomes of the organizations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lack of direct revenues compensated through other funding sources</td>
</tr>
<tr>
<td><strong>Data providers for cost savings</strong></td>
<td>Availability of higher quality data</td>
<td>Publishing data Cleaning data</td>
<td>Improved process and data Cost-savings</td>
</tr>
<tr>
<td><strong>Freemium data providers</strong></td>
<td>Availability of limited data for free and high quality data and data services at some cost</td>
<td>Publishing data Data maintenance More sophisticated data access services</td>
<td>Revenue from added value services</td>
</tr>
<tr>
<td><strong>Premium data providers</strong></td>
<td>High quality data at some cost Data meeting particular user needs at some cost</td>
<td>Publishing data Data maintenance Data visualization services Data analysis and interlinking services</td>
<td>Revenue from all data and advanced data services</td>
</tr>
</tbody>
</table>
## Summary for open data enablers

<table>
<thead>
<tr>
<th>Business model</th>
<th>Value proposition</th>
<th>Value creation</th>
<th>Value capture</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply facilitators</strong></td>
<td>Facilitating in providing access to geographic data resources, through provision of technologies and/or services</td>
<td>Publishing data Harmonizing data Metadata creation (Basic) data visualization and analysis services</td>
<td>Revenues from selling services or products to data providers (different revenue and pricings models can be adopted)</td>
</tr>
<tr>
<td><strong>Access facilitators</strong></td>
<td>Facilitating in access to geographic data resources, through provision of technologies and/or services Access to combined and/or integrated data resources</td>
<td>Structuring and classifying data Aggregating data (Basic) data visualization and analysis services</td>
<td>Revenues from selling services or products to data users (different revenue and pricings models can be adopted)</td>
</tr>
<tr>
<td><strong>Service creators</strong></td>
<td>Diversity of tailored solutions on top of geographic data</td>
<td>Creating applications and other solutions on top of geographic data</td>
<td>Revenues from selling solutions to different kind of end-users Revenues from developing solutions at the request of data providers</td>
</tr>
</tbody>
</table>
## Summary for open data end users

<table>
<thead>
<tr>
<th>Business model</th>
<th>Value proposition</th>
<th>Value creation</th>
<th>Value capture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data users</td>
<td>No common value proposition, because of diversity of public and private organizations that can be considered as users</td>
<td>Data used within organizational processes and activities, value mainly created through use of data in key processes of the organization</td>
<td>Improved business processes and outcomes. Revenues from main products and services delivered by the organization</td>
</tr>
</tbody>
</table>
Future developments
From platforms to ecosystems

Adapted from Rajafifard et al. 2002
From ecosystems to an ecosystem of ecosystems

http://www.kcopendata.eu
Implications for business models

1. From isolated business models to an ecosystem of business models

2. From concrete business models to adaptive business models

3. Triple Helix + citizens

4. Data governance & data ethics become more urgent

5. Trust building and capacity building are essential

http://www.kcopendata.eu
Thank you for your attention

TODO project: This project has received funding from the European Union’s Horizon 2020 research and innovation programme under Grant Agreement Number 857592 - TODO

For more information about the project, see https://todo-project.eu/

f.m.welledonker@tudelft.nl

http://www.kcopendata.eu
Literature


http://www.kcopendata.eu